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DOI: <https://doi.org/10.1111/aphw.12021>

Posted at the Zurich Open Repository and Archive, University of Zurich

ZORA URL: <https://doi.org/10.5167/uzh-88796>

Journal Article

Accepted Version

Originally published at:

Hennecke, Marie; Freund, Alexandra M (2014). Identifying success on the process level reduces negative effects of prior weight loss on subsequent weight loss during a low-calorie diet. *Applied Psychology: Health and Well-Being*, 6(1):48-66.

DOI: <https://doi.org/10.1111/aphw.12021>

Identifying Success on the Process Level Reduces Negative Effects of Prior Weight Loss on Subsequent Weight
Loss During a Low-Calorie Diet

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Abstract

Background: Dieters often show weight cycling, i.e., prior successful weight loss is followed by weight gain. The current study examined how goal progress *during* a diet (i.e., weight loss) impacts subsequent weight loss depending on whether success is identified on the process level or the outcome level of dieting. **Methods:** A short-term longitudinal study examined lagged effects of weight loss and identifications of success in one week on weight loss in the subsequent week. Across six weeks, $N = 126$ overweight women reported their weekly weight and the degree to which they considered themselves as successful regarding the process of dieting (e.g., changing eating behavior) and the desired dieting outcomes (e.g., improving appearance). **Results:** Successful weight loss in one week negatively affected weight loss in the subsequent week. However, identifying success on the process level reduced this negative effect. **Discussion:** Although people might feel generally that goal progress licenses subsequent goal-inconsistent behavior, identifying successful goal-pursuit on the process rather than the outcome level of a goal may counteract the subsequent loss of dieting motivation.

Keywords: Dieting, weight cycling, goal focus, goals, coasting, weight loss

Identifying Success on the Process Level Reduces Negative Effects of Prior Weight Loss on Subsequent Weight Loss During a Low-Caloric Diet

Overweight and obesity constitute a “global epidemic” (World Health Organization, n.d.) with major social, psychological and health consequences (for a review, see Stroebe, 2008). Moreover, current beauty ideals in the Western world stress slenderness as a key to appearing attractive, particularly for women (Fisher & Voracek, 2004). Thus, many women attempt to lose weight. However, losing weight is not easy: Although hypocaloric diets work well in the short run (e.g., Meckling, O’Sullivan, & Saari, 2004), dieters often fail to maintain their weight loss (e.g., Brownell & Rodin, 1994; Goodrick & Foreyt, 1991) or even gain more weight than they lost on their diets (for a review, see Mann et al., 2007). The term “Yo-Yo-effect” has been coined to describe the process of weight cycling that occurs if dieters, after losing weight, begin gaining weight again. Physiological explanations for the “Yo-Yo effect” have proposed diet-induced decreases in metabolic base rate which make further weight loss and even weight maintenance more difficult (Brownell, Greenwood, Stellar, & Shrager, 1986; Foster, Wadden, Swain, Anderson, & Vogt, 1999; Wyatt et al., 1999). More recently, behavioral changes have been discussed as the cause of weight cycling. For example, Lowe and colleagues have shown that obese people, after finishing a low-calorie diet, tend to eat more than before the diet and more than obese people who did not previously limit their food intake (Lowe, Foster, Kerzhnerman, Swain, & Wadden, 2001). This increased dietary intake may be caused by physiological needs that have to be met after periods of food deprivation. It may, however, also be caused by psychological reasons (Amigo & Fernandez, 2007). In this research, we examine one such psychological factor, namely how viewing one’s own weight loss with a focus on the process level of goal pursuit (as having dieted well; process focus of success) or with a focus on the outcome level of goal attainment (as having achieved weight loss; outcome focus of success), influences the effects of prior weight loss on subsequent weight loss. Before elaborating further on these hypotheses, we review psychological explanations for the detrimental effects of prior success on subsequent goal-directed efforts.

The psychological consequences of successful dieting on subsequent dieting

Various psychological processes have been proposed to explain negative effects of perceived goal progress on subsequent goal-directed efforts. First, the terms “coasting” and “balancing” describe how, in multiple goal contexts, progress on a focal goal liberates the goal pursuer to allocate goal-relevant resources (e.g., attention, time, money) to other important goals (Carver, 2006; Fishbach & Dhar, 2005, see also Nelissen, de Vet, & Zeelenberg, 2012). Losing weight is a goal that lends itself to “coasting” and “balancing” as it is highly unlikely that dieting is the only goal a person pursues at a given time. Because dieting likely draws on the same resources that are necessary to pursue other goals, experiencing dieting success may liberate the dieter to subsequently invest less effort into dieting. For instance, if preparing special meals congruent with the requirements of the low-caloric diet is time consuming, a successful dieter might substitute a diet meal with fast food, in order to make time for catching up with other, temporarily neglected responsibilities.

Second, “self-licensing” occurs if, after having exerted effort into the pursuit of a focal goal, people deliberately allow themselves the consumption of hedonic goods because they feel that they deserve it (Dhar & Simonson, 1999; Khan & Dhar, 2006; Kivetz & Zheng, 2006; Mukhopadhyay & Johar, 2009). For example, dieters might, after days of self-discipline and restraint, feel licensed to treat themselves to their favorite dishes.

A third, resource-based possible explanation for why previous goal progress impacts subsequent goal progress negatively, rests on the idea that willpower or self-control is a limited resource (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven & Baumeister, 2000). If, during a diet, self-control is frequently engaged to resist temptations, it may be used up, thereby impairing the capacity for subsequent self-control. Hence, it is not the perceived progress or subjective effort that leads to a decline in motivation and thereby causes subsequent performance declines, but the actual effort a person has expended that, in turn, without affecting motivation, leads to the inevitable resource-based performance decline.

Balancing, licensing, and ego depletion might all contribute to weight cycling. The current research was not designed to disentangle their unique effects. Instead, as elaborated in the next section, we propose a

motivational moderator that should affect the way individuals construe their goal progress (here: their weight loss success).

Identifying success as process- or outcome-related

Goals can be defined as subjectively desirable (or dreaded) states that a person intends to attain (or avoid, respectively) through action (Kruglanski, 1996). In other words, like wishes or desires, goals comprise desired outcome states but, unlike wishes or desires, they also encompass the means of goal pursuit (Kruglanski et al., 2002). For example, the goal to lose weight entails desired outcomes (e.g., to be more attractive, to improve one's health), as well as means to achieve these outcomes (e.g., to eat low-caloric food, to resist temptations). There are individual differences in the extent to which people focus on the *means* (process focus) or *outcomes* (outcome focus) of goal pursuit (Freund, Hennecke, & Mustafic, 2012; Freund, Hennecke, & Riediger, 2010; Sansone & Thoman, 2005; Vallacher & Wegner, 1987). Previous research on the impact of process and outcome focus on goal pursuit suggests that adopting a process focus is more beneficial than adopting an outcome focus. For example, focusing on the means rather than the desired outcomes of a low-calorie diet is positively related to weight loss (Freund & Hennecke, 2012). Similarly, a process rather than an outcome focus increases exercising adherence (Freund et al., 2010; Fishbach & Choi, 2012), hours spent on studying for an exam (Pham & Taylor, 1999) and dental flossing (Fishbach & Choi, 2012).

So far, process and outcome focus have been measured or manipulated as general cognitive inclinations, e.g., by asking participants how much they thought about what they have to do in order to eat low-caloric and low-fat food versus what weighing less would be like (Freund & Hennecke, 2012), or by instructing participants to focus on the experience of pursuing a goal-directed activity versus its instrumentality for external goals (Fishbach & Choi, 2012). The present research also takes the dynamics of goal pursuit into account by testing if identifying goal progress as success on the level of means or the level of desired outcomes impacts subsequent goal pursuit. Specifically, we propose that identifying success on the level of outcomes impacts negatively the motivation to invest future effort into the pursuit of the respective goal. In that sense, identifying success on the

level of outcomes might lead to similar effects as achieving subgoals: Reaching a subgoal generates a sense of achievement and is therefore followed by a period of complacency or coasting (Amir & Ariely, 2008). The feeling of having accomplished the attainment of desired outcomes should promote balancing and liberate the goal pursuer to allocate resources to other important goals (Carver, 2006; Fishbach & Dhar, 2005).

In contrast, if success is perceived as having done well on the process level it should not be linked to the same feelings of accomplishment. The means of goal pursuit primarily derive their importance from serving their superordinate goals (Austin & Vancouver, 1996; Ferguson & Bargh, 2004). They are motivationally less important than the ends they serve. This, in turn, has the consequence that success and failure located on the process level is followed by less intense affective reactions (Houser-Marko & Sheldon, 2008). As shown in previous research, positive affect that results from success and negative affect that results from failure to achieve the desired goal progress are driving forces that lead a goal pursuer to subsequently increase or decrease goal-related effort (Carver & Scheier, 1990; Fishbach, Eyal, & Finkelstein, 2010; Wilcox, Cramer, & Sen, 2011).

While probably not supporting balancing, identifying success on the process level might cause self-licensing: If a person feels that she has done well on the process level, i.e., has successfully put much effort into eating in accordance with the diet and resisting temptations, she might feel that she deserves a break from dieting and thereby justify the consumption of tasty, high-calorie food. This potential downside of process-focused construals of success, may, however, be counteracted by an strong benefit: Process-focused construals of success and failure are, by definition, rooted in action and might therefore, unlike outcome-focused construals of success or failure, provide the dieter with information about the adequacy of previously used strategies of goal pursuit. Whereas construing success and failure as the attainment or non-attainment of desired outcomes helps to identify the need to adjust action, construing success and failure as the successful or failed implementation of appropriate strategies provides concrete information about *how* to adjust action. The directive, strategy-shaping effect of a process focus may, similar to external process feedback, work much more

directly and accurately (Early, Northcraft, Lee & Lituchy, 1990). Whereas construing success and failure as outcome-related might have stronger motivational impact, construing it as process-related might have higher informational value.

The current research

To our knowledge, the present research represents the first study to investigate if goal progress during a diet (weight loss) impacts subsequent dieting success (weight loss in the next week) differentially depending on whether it is construed as having successfully implemented the means of dieting (process focus of success) or as having successfully achieved desired outcomes of dieting (outcome focus of success). We predict that weight loss in one week negatively impacts weight loss in the subsequent week. However, this effect should be increased by the degree to which success is located on the outcome level. In contrast, locating success on the process level should come with the benefit of being informative about successful strategies. It should thereby attenuate the detrimental effects of prior weight loss on subsequent dieting and weight change. Without doubt, “doing well” on the process level (e.g., successfully sticking to a low-calorie diet), will also result in successful goal attainment (i.e., weight loss). Hence, we expect process and outcome framings of success to be positively correlated, but to have differential psychological consequences.

Method

Participants

Overweight and obese women were invited to participate in a study on weight loss via advertisements in local newspapers (see also Freund & Hennecke, 2012). The study required participants to attend two group meetings at the Psychology Department at the University of Zurich where they got weighed, measured, and instructed two or three days before the six-week long diet and weighed about one week after the diet. We recruited only women, as we thought that participants might feel uncomfortable to address their weight problems in the company of the opposite sex. Women responded to the advertisement by email. They then received an email that informed them about the study’s purpose to learn more about the psychological

mechanisms of dieting, as well as about its duration and design. A few days later, a female research assistant called them to answer their individual questions and make sure they met the prerequisites for study participation. These included having internet access, not going on vacation, and not participating in other diet programs during the study, as well as having a Body Mass Index of at least 25 kg/m^2 . $N = 126$ overweight women (age: 19-77 years, $M = 47.2$ years, $SD = 15.9$, weight at baseline: 57-129 kg, $M = 84.9$ kg, $SD = 13.8$, Body Mass Index at baseline: $25-46 \text{ kg/m}^2$, $M = 31.6 \text{ kg/m}^2$, $SD = 5.0$) were eligible and participated in the study. Everyone in the sample intended to lose at least 2 kg ($M = 12.3$ kg, $SD = 8.26$) which equals 2.6 % of their initial body weight ($M = 14$ %, $SD = 7.4$).

Across the study, $n = 31$ participants (24.6 %) dropped out of the study. Thirteen of them dropped-out during the first three weeks of dieting, five during the final three weeks of dieting, 13 did not show up for the last measurement occasion. Drop-outs did not differ from continuers in terms of how much weight they intended to lose (neither absolute weight, nor in percentage of body weight), the number of their previous dieting attempts in the past two years, their baseline weight, or their baseline BMI (all $ts < .82$, all $ps < .42$). Interestingly, continuers had a significant higher mean process focus of success than dropouts ($M = 3.9$, $SD = 1.1$ vs. $M = 3.1$, $SD = 3.1$, $t(117) = 3.02$, $p = .003$) whereas there was no significant difference in mean outcome focus of success between continuers ($M = 3.6$, $SD = .81$) and dropouts ($M = 3.3$, $SD = .77$, $t(117) = 1.6$, $p = .115$). Note, however, that these means have to be interpreted with caution. They stem from unequal numbers of data points as there were fewer dropouts than continuers and dropouts have fewer data points than continuers. For our analyses, we used information on the level of data points, not participants, to predict weight loss in one week by process and outcome focus in the previous week. Moreover, hierarchical linear models can deal with designs that include unequal numbers of measurement occasions per participants.

Procedure

As described above, participants were invited to the laboratory for an instruction session and baseline measurement occasion during which weight and height was assessed before the diet. They received a book that

explained the diet in detail and provides a large number of recipes (Gerlach, Ort-Gottwald, & Petersen, 2007). Dieters are instructed to not exceed an intake of more than 1200 kcal/40 g fat a day. The “Brigitte diet” was chosen because an independent consumer organization recommended it as a healthy, balanced diet with a high probability of successful weight loss and subsequent maintenance (Stiftung Warentest, 2005).

Participants agreed to adhere to the diet for six weeks and to afterwards return for a final measurement occasion scheduled to take place at the University of Zurich after the diet. Participants read and signed an informed consent agreement before study participation. The consent form informed about the purpose, the procedure, and the duration of the study. Furthermore, participants were informed that the reimbursement (\$60) for study participation was paid regardless of whether they lost weight during the diet or not. The informed consent agreement emphasized that study participation was voluntary and that participants had the right to withdraw from the study at any time and that their data would be treated confidentially.

As we were originally also interested in testing the effects of goal focus on participants’ outcome- and process-focused construals of success, goal focus was also manipulated by requiring participants to elaborate on either the means (process focus, “I am dieting by...”) or the outcome of dieting (outcome focus, “I am dieting, in order to...”), or neither, in the case of the control group. During the six weeks of dieting, goal focus was also manipulated via daily diaries directing participants’ attention to either the outcome (e.g., weight loss, figure enhancement, by asking questions such as “How concrete are your ideas about the way you want to look like after the diet?” or “How much did you imagine the way you will look after reducing your weight?”) or the process of dieting (e.g., food preparation, eating behavior, by asking “How concrete are your ideas about what it means to eat in accordance to the diet?” or “How much did you think about what you must do to keep dieting?”). Manipulation checks were administered weekly. We asked participants to indicate their process and outcome focus by responding to the items “During the last week, how much did you think about what you have to do to eat low-caloric and low-fat?” and “During the last week, how much did you think about what weighing less would be like?” A multivariate analyses of variance revealed that the goal focus manipulation had no

significant effects on participants' process or outcome focus as measured in the manipulation check (Condition outcome focus: $M_{\text{outcome focus}} = 3.7$, $SD = 1.6$, $F(2,119) = 2.21$, $p = .12$; $M_{\text{process focus}} = 4.2$, $SD = 1.3$; condition process focus: $M_{\text{outcome focus}} = 4.3$, $SD = 1.1$, $M_{\text{process focus}} = 4.3$, $SD = 1.1$; $F(2,119) = .39$, $p = .68$). We therefore refrained from including the manipulation as a predictor of success identifications in our analyses.

During the six weeks of dieting, participants filled out online questionnaires every Saturday for which they received an e-mail reminder, providing us with measurement occasions 2 to 7. One week after the official end of the diet (i.e., about 7.5 weeks after the instruction session), participants were invited to the laboratory again in order to get weighed, providing us with the final measurement occasion 8. Participation was reimbursed with the local currency's equivalent of \$60.

Weekly Measures

Process and outcome focus of success and failure. During the diet, participants indicated how much they considered their previous week's diet a success or failure on four process-focused items: "*The way you persisted*," "*the way you have been dieting*," "*the way you resisted temptations*," "*your change in eating behavior*." They also indicated how much they considered their previous week's diet a success or failure on four outcome-focused items: "*Weight loss*," "*appearance*," "*health*," "*well-being*." The response scales ranged from -3 (*big failure*) to $+3$ (*big success*), including 0 as a neutral midpoint, and were recoded to range from 0 (*big failure*) to 6 (*big success*) in subsequent analyses. A confirmatory factor analysis supported the dimensional structure of the scale. The four process-focused items loaded highly on the same factor, with loadings between .68 and .81, and the four outcome-focused items loaded highly on a second factor, with loadings between .79 to .89. Together the two factors accounted for 80 % of the items' variance. As a consequence, we aggregated the four process-focused and the four outcome-focused items separately into mean scores for "outcome focus of success" and "process focus of success," respectively (see Table 2 for M , SD s, and correlations between the two scales). The internal consistencies were satisfactory (process focus of success: all Cronbach's $\alpha > .91$, outcome focus of success: all Cronbach's $\alpha > .81$), so were their retest-reliabilities across

all measurement occasions and participants (process focus of success: Cronbach's $\alpha > .83$, outcome focus of success: Cronbach's $\alpha > .89$).

As displayed in Table 1, at 75 % of all data points participants' process focus of success matched their outcome focus of success, i.e., if participants believed they were successful with regard to the process of dieting, they also considered themselves as successful in achieving desired outcomes of dieting. Likewise if participants believed they were unsuccessful with regard to the process of dieting, they also considered themselves as unsuccessful in achieving the desired outcomes of dieting. However, in 25 % of all data points, participants' assessments of their process-related success (or failure) did not match their assessments of their outcome-related success (or failure).

Weight loss. As described above, participants were weighed in our laboratory at the first and the last measurement occasions, i.e., before and after the 6 weeks of dieting. Every week in between, participants were instructed to weigh themselves and to report their current weight in the online questionnaire. The difference between the previous week's and the current weight served as an indicator of weight loss for each week. Absolute weight loss in kg and weight loss as percentage of participants' body weight at each measurement occasion were correlated with $r = .98$. As analyses using weight loss in percentage of body weight yielded almost identical results as analyses using weight loss in kg, we report results from analysis with absolute weight loss in kg throughout the text. Results in Table 3 also report results from the analysis with weight loss in percentage of body weight.

Statistical analyses

Due to the nested data structure, we used hierarchical linear modeling (HLM). The following mixed model was estimated with HLM 7 (Raudenbush, Bryk, & Congdon, n.d.):

$$\text{Weight loss}_{it} = b_{0i} + b_1 (\text{weight loss}_{it-1}) + b_2 (\text{outcome focus of success}_{it-1}) + b_3 (\text{process focus of success}_{it-1}) + b_4 (\text{weight loss}_{it-1} \times \text{outcome focus of success}_{it-1}) + b_5 (\text{weight loss}_{it-1} \times \text{process focus of success}_{it-1}) + u_i + e_{it}.$$

The t subscript refers to the within-person Level 1 observations. The i subscript refers to the participants (i.e., the Level 2 observations). Weight loss, outcome focus of success, process focus of success as well as the interactions of weight loss with these foci were entered at $(t-1)$ to predict weight loss in the subsequent week (t). All predictors were entered at Level 1 and group-mean centered prior to analyses (Enders & Tofighi, 2007; Nezlek, 2011). Due to limited degrees of freedom, no random error terms could be estimated on Level 2. The interpretation of fixed effects is equivalent to that of parameter estimates in ordinary least squares regression.

Results

Participants who remained in the study from beginning to end lost an average of 2.9 kg, with a maximum of 9.5 kg ($SD = 2.5$; note that these values do not match with the average weekly weight loss, as presented in Table 2, which also includes data of all dropouts). At 16.9 % of 562 valid data points, participants reported to have gained weight. Without one outlier who reported a weight gain of 10 kg, weight gain ranged between 0.1 kg and 5.3 kg per week. At 8.6% of measurement points, participants reported no weight change. At 70.3 % of all measurement occasions, participants reported to have lost weight. Without one outlier, who reported a weight loss of 9.8 kg per week, weekly weight loss ranged from 0.1 kg to 6.1 kg. As both maxima for weight loss and weight gain even without outliers seem very high and question the validity of participants' self-reports, we checked how well their self-reported weight changes from T1 to T7 matched their actual weight change from T1 and T8 as measured by us. Self-reported weight change from T1 to T7 and actual weight change from T1 to T8 were highly correlated ($r = .82, p < .001$). Furthermore, the fact that from T1 to T7 no participants reported an overall weight loss higher than 10 kg supports our assumption that, in general, participants' motivation to correctly report their weight was high. By inviting participants to the lab a second time which allowed us to check their actual weight loss, we furthermore hoped to increase participants' motivation to correctly report their weight throughout the study.

To ensure that participants' ratings of their success on the process- and outcome levels reflected their actual progress, we checked whether participants who had lost weight in a given week had also indicated

success scores above the neutral scale midpoint of the success scales. This was mostly the case: In 77.5 % of observations, participants who had lost weight in a given week also considered themselves as at least somewhat successful on the outcome focus of success scale. In 73.1 % of observations, participants who had lost weight also considered themselves as successful on the process focus of success scale. Moreover, the correlations of process and outcome-related success and weight loss were positive and significant ($r = .32, p < .001$ and $r = .30, p < .001$, respectively), indicating that participants' subjective foci of success and failure matched but were not redundant with weight loss. Thus, we could test if the representation of success as being located on the level of means or the on the level of outcomes moderated the impact of actual weight loss in the current week on weight loss in the subsequent week.

Unstandardized regression coefficients, their standard errors and p -values are displayed in Table 3. Indicating the predicted pattern of weight cycling, weight loss in any given week had a strong negative impact on weight loss in the subsequent week ($b = -.53, p = .03$). In other words, the more weight participants lost in one week, the less they lost (or the more they even gained) in the next week. As indicated by the significant effect of the weight loss \times process focus of success interaction ($b = .13, p = .01$), this effect was reduced if participants focused on weight loss in terms of the processes of dieting. No other main effect or interaction effect was significant. Due to the strong negative effect of weight loss in the current week on the subsequent week's weight loss, all predicted values are negative, indicating a predicted weight gain in weeks that follow weight loss. Figure 1 graphically displays the weight loss \times process focus of success interaction. As all predicted values for next week's weight loss had a negative sign and indicated weight gain, we plotted the predicted values of weight *gain* (by changing the sign) in any week t for an individual with an average level of outcome focus of success scoring 1 standard deviation above and below the mean of weight loss and process focus of success in week $t-1$ (Aiken & West, 1991). The model predicts that participants gained the most weight after having achieved high weight loss in the previous week without identifying this success with a process focus. Participants were most successful (or least unsuccessful) if they had not lost much weight in the

current week and also perceived themselves as not having been successful on the process-level.

Discussion

Psychologists often maintain that past behavior is the best positive predictor of future behavior (Ouellette & Wood, 1998). In stark contrast with this assumption, results of the current study indicate that prior behavior can be *negatively* associated with future behavior. Ironically, this seems to be the case when the prior behavior was positively linked to a desired outcome. In the present study, weight loss in one week had a strong negative impact on weight loss in the subsequent week. As hypothesized, the negative effect of prior weight loss on subsequent weight development was moderated, more specifically: dampened, by relating success to the level of the means of goal pursuit rather than to the level of outcomes. More specifically, when highly successful dieters considered themselves as “doing well” with regard to the implementation of the means of dieting, they were also more likely to maintain the dieting behavior in the subsequent week. Identifying success on the process level may be beneficial because it provides the dieter with the information that her strategies of goal pursuit are instrumental. Dieters who construe their success as implying a successful process of dieting experience that they are on the right path and may have concluded correctly that they should stick to their strategies. This effect of construing success on the process level seems to mirror the beneficial effects of external process-related feedback as shown by Early et al. (1990). At the same time, construing success on the process level may have directed dieters’ attention away from the fact that they got closer to their ideal weight. Accordingly, they might not have felt that their success licenses them to be more lenient and give in to temptation more often.

Interestingly, dieters who were not very successful but thought they had done very well in implementing the means were even more unsuccessful in the following week. This is probably the case because they erred in believing that they used successful goal-relevant means and continued using them whereas these means were, in fact, not helping them in losing weight.

Unexpectedly, construing failure as failure to attain *outcomes* was not related to weight loss. We had

expected that the identification of success on the level of outcomes leads to an even stronger reduction of subsequent effort to achieve the goal. An explanation could be that the weight loss progress as indicated by a bathroom scale in itself serves as sufficient outcome success feedback and that therefore, there is no room for our subjective outcome-success items to explain additional variance in subsequent weight loss.

Motivational vs. resource-based explanations

Whereas “coasting” and “self-licensing” effects are of a motivational nature, i.e., progress is considered to reduce subsequent motivation, we cannot fully refute a possible alternative explanation of our result, namely that previous goal pursuit does not only affect a goal pursuer’s subsequent motivation but also the *capacity* to put more effort into goal pursuit. Dieters constantly face temptations and have to exert self-control to resist them. If self-control is a depletable resource, controlling one’s desire to eat delicious but high-caloric food for some time might also be followed by a lack of self-control to subsequently control this desire (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven & Baumeister, 2000; but see Job, Dweck, & Walton, 2010). Hence, achieving high progress through the exertion of self-control should result in a period of low progress due to a subsequent lack of self-control. In our study, we cannot exclude this possibility. We believe, however, that the detrimental effects of prior weight loss on subsequent weight loss cannot fully be accounted for by a resource-based (or physiological) explanations, as they are moderated by process focus of success, a subjective construal that should not affect the depletion of an objective resource. Moreover, the time frame in which we observed the effect speaks in favor of motivational rather than resource-based explanations. The extant studies on self-control are based on immediate depletion (i.e., within hours) rather than delayed depletion. In fact, Muraven, Baumeister, and Tice (1999) suggest that, in the long run, self-control will build up just as muscles do when used frequently over longer periods of time.

The temporal dynamics of coasting: Salient episodes

Previous theorizing on weight cycling has looked at long-term effects of diets on weight maintenance. However, in our study, the time frame under study was much shorter. Within a six-week long diet, dieters have

reported negative effects of weight loss in one week on weight loss in the subsequent week. This attests to the idea that the motivational factors that may cause dieters to regain weight after their diets may also be at work on shorter time scales, as shown in our study.

Previous research on balancing has emphasized the importance of salient episodes into which people frame their goal-directed behaviors (Dhar & Simonson, 1999). Applied to dieting, this means that a dieter who thinks in short temporal periods might decide that having a salad as a main course licenses having a dessert afterwards. In contrast, a dieter who frames her behavior in longer temporal periods might also balance meals in longer time frames (e.g., when dieting for a week, I can allow myself one day “off” the diet; after finishing a diet, I can allow myself the occasional fast food again). The weekly assessments used in the present study probably induced a weeklong time frame to the dieters. On the one hand, this probably reduces coasting in shorter time frames. On the other hand, weekly assessments might not capture short-term fluctuations. It is even possible that people who pursue a goal monitor their progress on different time scales at the same time and that the temporal dynamics of coasting can be observed concurrently on these different time scales. It would be most interesting for future research to identify manipulations by which time frames can be modified in a way that reduces coasting effects. It might be that extending time frames to longer time periods such as months (e.g., by giving dieters only monthly feedback about their actual weight loss), helps to reduce coasting by shifting the detrimental effects of previous success to a more extended time scale. As in our study, dieters could weigh themselves whenever they wanted to, we cannot be sure that weeks were the most salient time frame for participants to evaluate their own goal progress.

Finally, dieting is a goal that holds cumulative benefits. Weight loss is measured on a continuous scale and each pound that is lost makes the person one pound lighter, one pound more attractive, one pound healthier. Whereas goals with cumulative benefits render themselves to coasting, coasting may be less likely to occur during the pursuit of all-or-nothing goals, i.e., goals where progress is useless until a specific end point has been reached (e.g., attaining a school degree, finishing a marathon). Focusing on the process might have

helped dieters not to let the additional benefits of every lost pound reduce their motivation to achieve the overall goal. In that logic, an outcome focus might not be detrimental if the goal at hand is an “all-or-nothing” goal and progress towards the goal does not come with benefits unless the overall goal is achieved. If, for example, a dieter aims at fitting into her “slim jeans” at the end of the diet period, losing pounds without having yet achieved this goal may not reduce subsequent motivation. Future research will have to address this possibility.

Can previous progress increase subsequent dieting success?

The effects found in our study match with previously reported detrimental effects of prior progress on subsequent performance. However, there are certain conditions under which prior success should motivate a dieter to continue her efforts and thereby fosters subsequent successes. If, for example, dieters perceive their own progress as a sign of their commitment to dieting (“The fact that I did well in the past week shows how important it is to me to lose weight.”), their prior success may lead to sustained or even increased motivation (Bem, 1972; Fishbach & Dhar, 2005, 2006; Soman & Cheema, 2004). Moreover, prior progress may increase dieters’ self-efficacy beliefs. As proposed by Bandura (1977) mastery experiences constitute an effective way of developing people’s sense of self-efficacy. In turn, akin to an upward spiral, a higher sense of efficacy should promote the successful continuation of dietary efforts. Our data suggests that these two mechanisms are either not at play in our study or they are counteracted by the de-motivating effects of prior success on subsequent performance.

Participants in our study had high commitment throughout the study as indicated by the sample’s negatively skewed scores and the little variance on the items “How important is achieving the goal to you?” at baseline ($M = 4.7$, $SD = .6$, skewness = -1.6) and throughout the diet (all M s > 4.2 , SD s < 1.8 , skewness $< -.66$). Thus, due to a ceiling effect, progress may not have helped dieters to further boost their already high commitment to the weight loss goal.

Although total weight loss predicted increases in self-efficacy from baseline to after the diet ($\beta = .48$, $p < .001$), self-efficacy did not predict total weight loss ($\beta = .03$, $p = .73$). This indicates that although successful

weight loss contributed to self-efficacy, self-efficacy did not, in turn, contribute to successful weight loss, at least not in our study. Interestingly, an exploratory analysis revealed that process-related identifications of success predicted increases in self-efficacy from baseline to after the diet ($\beta = .34, p = .01$) whereas outcome-related identifications did not predict changes in self-efficacy ($\beta = .12, p = .37$), suggesting an additional benefit of process over outcome focus of success which should be replicated in future research.

Conclusion

The present study demonstrates detrimental effects of prior weight loss on subsequent weight change. The effect may occur because previous success is perceived as a license to indulge subsequently, because it liberates goal-relevant resources such as time, effort, or energy, that may, in turn, be devoted to other goals, or because people deplete their self-regulatory capacity and subsequently fail to exert more willpower. As of yet, we cannot clearly distinguish what drove the effect. Importantly, identifying previous success in losing weight on the level of the dieting *process* (e.g., as having successfully resisted temptations and having successfully changed one's eating behavior) decreased the detrimental effect of prior weight loss on subsequent dieting.

In the present study, women pursued the personal goal of losing weight by means of a low-caloric diet in their everyday settings, an everyday goal that many people share. This points to the high relevance of our findings for the pursuit of important everyday goals. Moreover, the longitudinal design of the study encompassing eight measurement occasions allowed testing temporally lagged associations, approximating causal effects of process-related success on subsequent goal-directed behavior. For an even more stringent test of causal effects, future research needs to involve an experimental manipulation of the identification of success or failure of goal pursuit and achievement on the level of the means or the outcome, respectively. On the basis of such experimental findings, interventions could be developed that might help dieters to stick to their diet across extended time periods. More generally, the present paper demonstrates the importance of considering self-regulatory processes in the design of such interventions (see also Mann, de Ridder, & Fujita, 2013).

References

- Aiken, L. S., & West, S. G. (1991). *Multiple Regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Amigo, I., & Fernandez, C. (2007). Effects of diets and their role in weight control. *Psychology, Health, & Medicine, 12*(3), 321-327.
- Amir, O., & Ariely, D. (2008). Resting on laurels: The effects of discrete progress markers as subgoals on task performance and preferences. *Journal of Experimental Psychology: Learning Memory and Cognition, 34*(5), 1158–71.
- Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin, 120*(3), 338–375.
- Baumeister, R. F., Bratslavsky, E., Muraven, E., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*(5), 1252–1265.
- Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology, Vol., 6* (pp. 1-62). New York: Academic Press.
- Brownell, K. D., Greenwood, M. R. C., Steller, E., & Shrager, E. E. (1986). The effects of repeated cycles of weight loss and regain in rats. *Physiology and Behavior, 38*, 459-464.
- Carver, C. S. (2006). Approach, avoidance, and the self-regulation of affect and action. *Motivation and Emotion, 30*(2), 105–110.
- Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review, 97*, 19–35.
- De Witt Huberts, J. C., Evers, C., & De Ridder, D. T. D. (2012). License to sin: Self-licensing as underlying mechanism of hedonic consumption. *European Journal of Social Psychology, 42*(4), 490–496.
- Dhar, R., & Simonson, I. (1999). Making complementary choices in consumption episodes: Highlighting versus balancing. *Journal of Marketing Research, 36*(1), 29–44.

- Early, P. C., Northcraft, G. B., Lee, C., & Lituchy, T. R. (1990). Impact of process and outcome feedback on the relation of goal setting to task performance. *The Academy of Management Journal*, 33(1), 87-105.
- Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, 12(2), 121–128.
- Ferguson, M. J., & Bargh, J. A. (2004). Liking is for doing: The effects of goal pursuit on automatic evaluation. *Journal of Personality and Social Psychology*, 87(5), 557–575.
- Fishbach, A., & Choi, J. (2012). When thinking about goals undermines goal pursuit. *Organizational Behavior and Human Decision Processes*, 118(2), 99–107.
- Fishbach, A., & Dhar, R. (2005). Goals as excuses or guides: The liberating effect of perceived goal progress on choice. *Journal of Consumer Research*, 32(3), 370–377.
- Fishbach, A., Eyal, T., & Finkelstein, S. R. (2010). How positive and negative feedback motivate goal pursuit. *Social and Personality Psychology Compass*, 4(8), 517–530.
- Fisher, M.L., & Voracek M. (2006). The shape of beauty: Determinants of female physical attractiveness. *Journal of Cosmetic Dermatology*, 5(2), 190-194. doi:10.1111/j.1473-2165.2006.00249.x.
- Foster, G. D., Wadden, T. A., Swain, R. M., Anderson, D. A., & Vogt, R. A. (1999). Changes in resting energy expenditure after weight loss in obese African American and white women. *American Journal of Clinical Nutrition*, 69, 13-17.
- Freund, A. M., & Hennecke, M. (2012). Changing eating behaviour vs. losing weight: The role of goal focus for weight loss in overweight women. *Psychology and Health*, 7(Suppl.2), 25–42.
- Freund, A. M., Hennecke, M., & Mustafic, M. (2012). On gains and losses, means and ends: Goal orientation and goal focus across adulthood. In: R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 280–300). New York, NY: Oxford University Press.
- Freund, A. M., Hennecke, M., & Riediger, M. (2010). Age-related differences in outcome and process goal focus. *European Journal of Developmental Psychology*, 7(2), 198–222.

- Gerlach, S., Ort-Gottwald, A., & Petersen, A. (2007). *Brigitte-Diaet: Das Programm, das in mein Leben passt* [*The Brigitte diet: The program that fits into my life*]. Munich, Germany: Diana.
- Goodrick, G. K., & Foreyt, J. P. (1991). Why treatments for obesity don't last. *Journal of the American Dietetic Association, 91*, 1243-1247.
- Houser-Marko, L., & Sheldon, K. (2008). Eyes on the prize or nose to the grindstone: The effects of level of goal evaluation on mood and motivation. *Personality and Social Psychology Bulletin, 34*(11), 1556–1569.
- Job, V., Dweck, C. S., & Walton, G. M. (2010). Ego-depletion – Is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science, 21*(11), 1686–1693.
- Khan, U., & Dhar, R. (2006). Licensing effects in consumer choice. *Journal of Marketing Research, 153*, 259-266.
- Kivetz, R., & Zheng, Y. (2006). Determinants of justification and self-control. *Journal of Experimental Psychology: General, 135*, 572-587.
- Kruglanski, A. W. (1996). Goals as knowledge structures. In P. M. Gollwitzer, & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 599–618). New York, NY: Guilford.
- Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal systems. *Advances in Experimental Social Psychology, 34*, 331–378.
- Lowe, M., Foster, G. D., Kerzhnerman, I., Swain, R. M., & Wadden, T. (2001). Restrictive dieting vs. “undieting.” Effects of eating regulation on obese clinic attenders. *Addictive Behaviors, 26*, 253-266.
- Mann, T., de Ridder, D., & Fujita, K. (2013). Self-regulation of health behavior: Social psychological approaches to goal setting and goal striving. *Health Psychology, 32*, 487-498.
- Mann, T., Tomiyama, J., Westling, E., Lew, A.-M., Samuels, B., & Chatman, J. (2007). Medicare's search of effective obesity treatments: Diets are not the answer. *American Psychologist, 62* (3), 220-233.

- Meckling, K. A., O'Sullivan, C., & Saari, D. (2004). Comparison of a low-fat diet to a low-carbohydrate diet on weight loss, body composition and risk factors for diabetes and cardiovascular disease in free-living, overweight men and women. *The Journal of Clinical Endocrinology and Metabolism*, 89, 2717-2723.
- Mukhopadhyay, A., & Johar, G. V. (2009). Indulgence as self-reward for prior shopping restraint: A justification-based mechanism. *Journal of Consumer Psychology*, 19, 334-435.
- Muraven, M. & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, 126, 247-259.
- Muraven, M., Baumeister, R. F., & Tice, D. M. (1999). Longitudinal improvement of self-regulation through practice: Building self-control strength through repeated exercise. *Journal of Social Psychology*, 139(4), 446-457.
- Nelissen, R. M. A., de Vet, E., & Zeelenberg, M. (2011). Anticipated emotions and effort allocation in weight goal striving. *British Journal of Health Psychology*, 16, 201-212.
- Nezlek, J. B. (2011). *Multilevel modeling for social and personality psychology*. London, UK: Sage.
- Ouellete, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, 124(1), 54-74.
- Pham, L. B., & Taylor, S. E. (1999). From thought to action: Effects of process- versus outcome-based mental simulations on performance. *Personality and Social Psychology Bulletin*, 25(2), 250-260.
- Raudenbush, S. W., Bryk, A. S., & Congdon, R. (n.d.). *HLM 7 for Windows* [Computer software]. Skokie, IL: Scientific Software International, Inc..
- Sansone, C., & Thoman, D. B. (2005). Interest as the missing motivator in self-regulation. *European Psychologist*, 10(3), 175-186.
- Soman, D., & Cheema, A. (2004). When goals are counterproductive: The effects of violation of a behavioral goal on subsequent performance. *Journal of Consumer Research*, 31, 52-62.
- Stiftung Warentest (2005). *TEST Spezial: 90 Diaeten für Sie bewertet* [Test special: 90 diets tested for you].

Berlin, Germany: Stiftung Warentest.

Stroebe, W. (2008). *Dieting, overweight, and obesity: Self-regulation in a food-rich environment*. Washington,

DC: American Psychological Association.

Vallacher, R. R., & Wegner, D. M. (1987). What do people think they're doing? Action identification and

human behavior. *Psychological Review*, 94(1), 3–15.

Wilcox, K., Cramer, T., & Sen, S. (2011). Indulgence or self-control: A dual process model of the effect of

incidental pride on indulgent choice. *Journal of Consumer Research*, 38(1), 151–163.

World Health Organization (n.d.). *Controlling the global obesity epidemic*. Retrieved 11 October 2012, from

<http://www.who.int/nutrition/topics/obesity/en/>

Wyatt, H. R., Grunwald, G. K., Seagle, H. M., Klem, M. L., McGuire, M. T., & Hill, J. O. (1999). Resting

energy expenditure in reduced-obese subjects in the National Weight Control Registry. *American Journal of Clinical Nutrition*, 69, 1189-1193.

Table 1

Overview of Possible Combinations of Process and Outcome Focus of Success.

		Process focus of success: Degree of success in persisting, dieting, resisting temptations, and changing one's eating behavior	
		Low	High
Outcome focus of success: Degree of success in achieving weight loss, an improvement of one's appearance, health, and wellbeing	Low	Person thinks she has not dieted well and not achieved weight loss: 37.4 % of data points	Person thinks she has dieted well but not achieved weight loss: 15.1 % of data points
	High	Person thinks she has not dieted well but achieved weight loss: 10.4 % of data points	Person thinks she has dieted well and achieved weight loss: 37.1 % of data points

Note. The number of data points for each combination in the actual data have been identified by performing grand median splits on the two continuous variables process focus of success ($Md = 4.0$) and outcome focus of success ($Md = 3.5$). Total number of data points = 596.

Table 2

Grand Means, Minima, Maxima, Standard Deviations, and Intercorrelations of Outcome Success, and Process Success From Weekly Online Questionnaires

	<i>M</i>	<i>Min</i>	<i>Max</i>	<i>SD</i>	<i>r</i> with outcome success	<i>r</i> with process success
Weekly weight loss in kg	.64	−10.00	9.80	1.20	.30 ($p < .001$)	.32 ($p < .001$)
Weekly weight loss in % of body weight	.76	−18.42	15.29	1.61	.25 ($p < .001$)	.27 ($p < .001$)
Outcome success	3.49	0.00	6.00	1.03	-	.64 ($p < .001$)
Process success	3.60	0.00	6.00	1.44	-	-

Table 3

Selected Results From a Hierarchical Linear Model Predicting Next Week's Weight Loss (in % of Body Weight)

	Dependent variable: Weight loss next week (in % of body weight)		
	<i>b</i>	<i>SE</i>	<i>p</i>
Intercept	.36 (.42)	.04 (.04)	< .001 (< .001)
Weight loss (in % of body weight)	-.53 (-.72)	.24 (.21)	.028 (< .001)
Outcome focus of success	-.07 (-.08)	.07 (.09)	.317 (.337)
Process success of success	-.07 (-.07)	.08 (.10)	.350 (.469)
Weight loss (in % of body weight) × Outcome focus of success	.03 (.01)	.06 (.06)	.633 (.857)
Weight loss (in % of body weight) × Process focus of success	.13 (.13)	.05 (.05)	.014 (.006)

Note. Least squares estimates of fixed effects with robust standard errors. Results from the hierarchical linear model predicting next week's weight loss in % of body weight by this week's weight loss in % of body weight are displayed in parentheses.

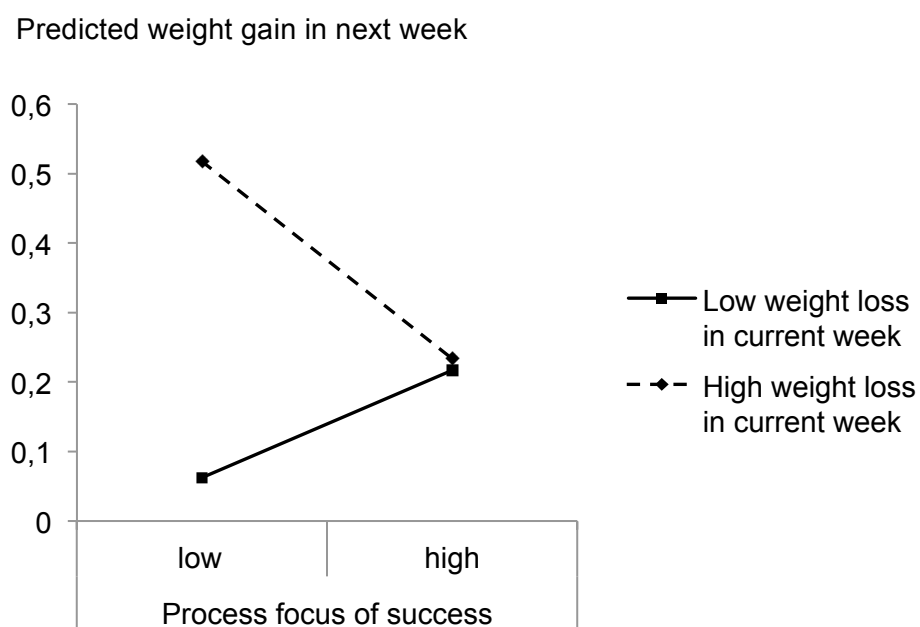


Figure 1. Predicted values for next week's weight gain as a function of weight loss in the current week and process success ratings. As depicted in the figure, weight loss in the current week predicts weight gain in the next week. This effect is moderated by process focus of success: Weight gain is highest if high weight loss in the current week is identified without construing success on the process level. "Low" and "high" indicates current week's weight loss and process focus of success ratings to be 1 *SD* below or above the mean, respectively. Outcome focus success ratings are set to the sample average.